$$
\begin{array}{llll}
a=15, & d=1, & x=49, & y=56. \\
 & d=3, & x=12, & y=18. \\
 & d=5, & x=5, & y=10. \\
a=18, & d=2, & x=32, & y=40. \\
 & d=6, & x=6, & y=12.
\end{array}
$$

II. Solution by A. H. HOLMES, Brunswick, Me.

Solving with respect to x, $x=\dfrac{\pm\sqrt{(4y^2+a^2)}-a}{2}$.

Take $a=p^2-q^2$ and $y=pq$.

Then $x=\dfrac{\pm(p^2+q^2)-p^2+q^2}{2}=q^2$ or $-p^2$, in which p and q can be any integers, $p>q$.

Put $q=1$, $p=2$. Then $x=1$ or -4, $a=3$, and $y=2$.

Secondly. Put a=any integer, say 23. $x^2+23x=y^2$.

$\therefore x=\dfrac{\pm\sqrt{(4y^2+529)}-23}{2}$.

Put $y=pq$ and $23=p^2-q^2$.

Then $x=\dfrac{\pm(p^2+q^2)-p^2+q^2}{2}=q^2$ or $-p^2$.

$p^2-q^2=(p+q)(p-q)=23=23\times1$.

$\therefore p+q=23$, and $p-q=1$. $\therefore p=12$ and $q=11$.

$\therefore x=121$ or -144, $y=132$.

Also solved by the late G. B. M. Zerr, and S. Lefsehetz.

PROBLEMS FOR SOLUTION.

ALGEBRA.

349. Proposed by JOSEPH A. NYBERG, Student, University of Chicago.

To show that the determinant of the nth order:

$$
D_n=\begin{vmatrix}
C & -1 & 0 & 0 & 0 & 0 & 0 & . & . \\
-1 & C & -1 & 0 & 0 & 0 & 0 & . & . \\
0 & -1 & C & -1 & 0 & 0 & 0 & . & . \\
0 & 0 & -1 & C & -1 & 0 & 0 & . & . \\
0 & 0 & 0 & -1 & C & -1 & 0 & . & . \\
0 & 0 & 0 & 0 & -1 & C & -1 & . & . \\
. & . & . & . & . & . & . & . & . \\
. & . & . & . & . & . & . & . & .
\end{vmatrix}
$$

has the value: $D_n=C^n+\sum\limits_{r=1}^{n}(-1)^r\dfrac{(n-r)(n-r-1)\ldots(n-2r+1)}{r!}C^{n-2r}$.

350. Proposed by V. M. SPUNAR, M. and E. E., Chicago, Ill.

Solve the equations: $x+y+z=a_0$,
$x+yu+zv=a_1$,
$x+yu^2+zv^2=a_2$,
$x+yu^3+zv^3=a_3$,
$x+yu^4+zv^4=a_4$.

CALCULUS.

304. Proposed by H. C. FEEMSTER, York College, York, Neb.

Reduce $axyp^2+(x^2-ay^2-b)p-xy=0$ to Clairaut's form, and hence solve the equation.

305. Proposed by C. N. SCHMALL, New York City.

Prove $\int_\beta^x \frac{dx}{\sqrt{[(\alpha-x)(x-\beta)]}}=2\cos^{-1}\sqrt{\frac{\alpha-x}{\alpha-\beta}}$. [Edwards' *Integral Calculus for Beginners*, p. 84, ex. 4.] Does this result hold when the upper limit is changed from x to α?

MECHANICS.

358. Proposed by W. J. GREENSTREET, M. A., Stroud, England.

Two heavy particles connected by a string, length l, lie one on each of two inclined planes with common horizontal edge and of angles α and β. The inclination of the string to the edge varies as the inclination to the horizon of a simple pendulum of length $l(\sin\alpha+\sin\beta)$.

NUMBER THEORY AND DIOPHANTINE ANALYSIS.

178. Proposed by PROFESSOR L. E. DICKSON, Ph. D., The University of Chicago.

Find a formula which gives all the integral solutions prime to 5 of the congruence $y^2+z^2\equiv 0 \pmod{5^4}$.

179. Proposed by V. M. SPUNAR, Chicago, Ill.

Solve the equation in integers, $x^n+y^n+z^n+xyz=100x+10y+z$.

180. Proposed by A. H. HOLMES, Brunswick, Maine.

Find integral values for x and y in the following: $96x-96y+21=\square$.

NOTES AND NEWS.

Dr. Arnold Emch, of Basel, Switzerland, has sailed for America and expects to assume his duties as Assistant Professor of Mathematics in the University of Illinois at the beginning of the second semister. Professor Emch is the author of numerous articles, which appeared in various journals